Smart Practices: Reflections on the Smarter Home Visit in two London boroughs

Other

CRESC Working Paper Series

Working Paper No. 140

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Kellie Payne and Sophie Watson

CRESC, The University of Manchester and the Open University

January 2016

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Smart city initiatives have proliferated across the globe over the last decade generating huge quantities of data and intervening to transform the behaviour of cities and the individuals who reside there. Cities are being re-visioned as spaces of technological efficiency where information technology is combined with infrastructure, architecture, material artefacts and humans to produce complex solutions to the perceived problems of everyday life in the city. Amongst a plethora of initiatives, smart city interventions aspire to address the mobility of older people, enable energy savings, enhance sustainability, support small and medium enterprises. The rhetoric is often rather difficult to disentangle from the material and social effects of initiatives on the ground, and there is still patchy research on how smart initiatives are differently received across different socio-cultural groups and what differentiated practices unfold as they are rolled out. As Cosgrave et al (2014, 74) have pointed out there has been 'a failure to seriously interrogate the impact of these on citizens… these impacts sit across social, political and economic boundaries and may end up disenfranchising people or increasing inequality'.

This paper concerns a smart initiative to reduce household water consumption and to change domestic practices around water use. In 2014 Thames Water in conjunction with the environmental charity Groundwork- initiated the Smarter Home Visit in Bexley and Greenwich in London. In advance of their roll out of smart meters across the region, the aim was to offer household visits that are designed to give expert advice on how to reduce water use and offer the

fitting of free water saving devices. Similar programmes have been carried out in several other countries and cities, notably in Australia where drought conditions have motivated water companies to find ways of reducing demand.

Studies of such initiatives have revealed a number of interesting findings. In their study of 252 households in South-East Queensland (smart metre data, along with psycho-social and socio-demographic surveys, inventory audits and self-reported water diaries) Beal, Stewart et al. (2013) report recent research that has shown that 'householders' perceptions of their water use are often not well matched with their actual water use ' and that 'attitudes and behaviour towards potable water supplies have changed due to greater social awareness and increasingly widespread exposure to drought conditions; people are beginning to genuinely value water as a precious resource' (116). In our research we were interested to investigate whether the same shifts had taken place in the UK. These authors also noted that water consumption patterns and behaviours strongly vary across households according to local climate, socio-demographics, house size, family composition, water appliances, cultural and personal practices (ibid,117). Gilg and Barr (2006) similarly examined the social, attitudinal and behavioural composition of water saving activities using a sample of 1600 households from Devon. This followed previous research (Hamilton, 1983, De Oliver, 1999) which explored the socio-demographic attributes of water conservers, where De Oliver (1999), for example, reported an inverse relationship between income and education level and conservation echoing Hines et al (1987) which found water conservation practices were associated with high income groups.

The study

This research was initiated following a series of meetings with Thames Water where CRESC/OU proposed the idea to the TW water efficiency team, following Sophie Watson' s research interest in socio-cultural change and water consumption practices. This report is based on research carried out on the smart home visits conducted by Groundwork's Green Doctors from August 2014 to January 2015. The researchers shadowed 9 Green Doctors during 120 home visits to households, in Bexley and Greenwich, which had been selected as higher than average water users. In the final stage of the project, 20 in depth follow up interviews were conducted with a selection of households that had received a smart home visit, and a further 25 telephone interviews were carried out.

1. Green Doctor Smart Home Visits

There are two major parts to a Green Doctor (GD) visit: the questionnaire and the installation. Different GDs conduct the visit in different ways. Some begin with the installations and end with the questionnaire, while others begin with the questionnaire and build a rapport with the householder before carrying out the installation. The questionnaire usually takes between twenty and thirty minutes for the GD to administer, calculate the estimated bills and discuss the recommended behaviour changes based on the householder's water use. Information is collected on tenure, length of residence, the number of occupants, the age of the house/flat, the type of toilets and the boiler. After collecting this information, the GD can calculate a typical average bill for a household of that size, and this is reported to the householder. Following these preliminary questions, the GD gathers information on water use, asking the householder to estimate the amount of water they use in different parts of the house: the amount of times they wash the dishes during the week, whether they use a dishwasher or not- and if not whether they use a bowl in the sink, and the number of loads of laundry they do in a week. They also ask how many showers and baths the household takes and ask for the householder to estimate the amount of time spent in the shower. They ask whether the person keeps the tap running or turns it off while they brush their teeth. They also ask about the garden - if they have one- how often it is watered and whether they collect rainwater in a water butt.

Based on this information the GD can estimate what the householder's bill, and compare the household's water use against that of an average household of their size. Also if the GD has installed the devices first, some GDs calculate how much water the householder will save with the devices. Next, the GD makes recommendations for saving water such as: the use of a bowl when washing up, the use of a dishwasher, reduction in dishwashing activities, a full load for the washing machine, a reduction of shower time to four minutes turning off the tap while brushing teeth. The GD makes these suggested changes to the water use for the house and a new estimated bill amount is given which is then compared to the average household bill and their current bill. Once this is calculated, the GD usually summarises the suggested behaviour changes they recommended.

Installation of devices

This aspect of the visit consists of an inspection of the kitchen and each bathroom in the house to see which devices can be installed. The devices include:

- **Tap aerators** (a small plastic device which can be installed into the end of a tap to increase the air which is distributed through the water as it comes out of the tap which decreases the volume of water but doesn't affect its pressure)
- **Swivel tap** (an extension that can be added to the end of some kitchen taps which enables the user to direct the flow of water)
- **Shower head** (these shower heads reduce the flow of water to 7 Litres.

- **Shower regulator** (if a householder wishes to keep their own shower head a regulator, similar to the tap aerators can be installed between the shower hose and head which aerates the water and cuts down the amount of water flowing out of the showerhead)
- **Shower timer** (a small egg timer which helps householders limit their shower time to 4 minutes)
- **Save-a-flush** (a plastic bag with crystals which expands when placed in the cistern and decreases the amount of water used by a litre each flush)
- **Fat traps** (small cardboard boxes lined with plastic which can be used to collect oils and fats instead of putting them down the drains)
- **Kids pack** (a small pack of stickers, game of cards and information about saving water aimed at children)

2. Green Doctor interviews

Process

Each GD had different styles of approach and modes of interacting with the householders from sitting in the kitchen first to conduct the survey on household water use, to conducting the survey after having installed devices. Our observation was that the latter method worked better when more rapport had been established, given the intrusive and personal nature of the questions, which not surprisingly made some households feel defensive particularly those whose behaviour

(such as running the water during teeth brushing) was being implicitly challenged. Some of the GDs took a different view:

Tony: *I take my bucket in with all the things in there and say right, ok, now that we've done that bit, that's the behaviour change, now let's see what I've got here, let's put on first kitchen swivel tap, fat traps, then I say right, let's look at the bathrooms now, etc.*

I think it kind of depends on whether your appointment is booked or you're door knocking. If you're door knocking you take a bit longer to build up a rapport, bear in mind you've just come in, especially the whole door-to-door salesman, they're a bit suspicious, do you have any ID, normally people don't ask for ID, but I do show it if I'm door knocking, so I suppose that does have a factor in it.

'*I say- can we go in the kitchen first, I tend to stand in the kitchen because you can see the washing machine, I can see the dishwasher... I think it is building up a rapport, I don't first ask to see the bathroom, you're bulldozing in there, it does help to build rapport'*. (Linda).

The majority of the GDs reported instances of confusion on the part of the householders as to the purpose of the visit, or concerning who they actually represented and what to expect. As Linda explained: '*They don't realise we work for an environmental charity, that we work hand-in-hand with Thames water. I used to say I work for an environmental charity working in partnership with Thames Water but that actually causes people to switch off when you say environmental charity because they think you're trying to sell them something, so I stopped doing that and just say I'm from Thames Water now. But it's a little bit misleading, because they think 'yeah, someone from Thames Water, finally I can talk about my issue and sort it all out' and you're not the answer*'.

Linda reported a dislike of pumping out the meter in the street, which she found strenuous, mucky and tiring. She also reported that people who had on-going problems with Thames Water would be grumpy and frustrated and have a tendency to take it out on the GD. Everyone agreed on the necessity of quickly establishing a rapport with the householder, and being adaptable to the situation encountered and some of the GDs were particularly adept at this. John described his approach:

If I don't know, I'm happy to say so- - I phone them back- they are so surprised and positive. Surprised that I did what I promised. When you do them things- the word spreads- so next time I go to a neighbour's house they are OK- you went to my neighbours' house – how is she?... I previously could have been knocking with no response'.

Linda identified gender differences, where the women GDs in her view, were more prepared to get involved in 'social niceties'.

There were mixed views about the success of letters being sent prior to the visit. Though it eased the entry in many cases, for the lower income less educated households, letters could be a deterrent. As John explained:

'*It is all about education. All they see is letters. They see Thames Water and they fold it. I say have you heard from Thames Water- no- then I see the letter on the table. To them letters is anxiety*.

Other GDs mentioned the potential for confusion as to the purpose of the visit: *Some people are expecting to receive products so when they don't get something they're thinking maybe- was it worth having done, I was under the impression I was going to get this that and the other?* (Al).

The installation of free devices (freebies) was certainly seen as enabling access. The GDs also reported household suspicion as to why Thames Water were making the visits (something we observed also), which one of the GDs (Tony) dealt with by explaining' *the graph we have been shown which shows agreed extraction rates are going down and the population is going up - hence*

average consumption has gone up from 150 litres per person to 160. So over time there isn't going to be enough'.

Some householders were also reported to be reluctant to give their name, particularly if they were involved in activities that might be considered borderline illegal, or if they were in arrears on their account. So the crucial issue was seen to be how to gain entry to the dwelling, which involves skill and sensitivity on the part of the GDs. As John explained: *'If you arrive with a suit and tie - they don't want to let people in like that - tone it down a bit and they will let you in.*

You could know your stuff- what we are doing what you aim to achieve- you won't get there if you can't see these things. It's all about being sensitive….People's impression of you is what counts- you see a kid crying and she says it's not the right time now- so you bring out the kid pack. They are usually given last. But you bring it out- Mum's pleased you related to the child. Kid is subdued. While she sees to her kid. I explain what I need to do- come back and sit down later. So may be best if I start downstairs with the kitchen or bathroom- not going to go upstairs first- she sees I am all right – trusts me and lets me go upstairs. Get the stuff in there first- then talk……. By that time the kid is all right and we can talk about what she does, her behaviour etc.- if not, you are going to be told- this isn't the right time- when is the right time- Thursday- then when Thursday comes- it's not right time also. So you miss the opportunity for someone you could have helped….Kids appreciate the pack. And they are learning as well. Even if they don't' change their shower times- they now have a showerhead that is going to make a difference'

Changing behaviour, devices and financial incentives

The GDs were all concerned to help reduce householders' water use through their advice in combination with the installation of devices. Though there was considerable socio-demographic variation in both water use practices and responses to the intervention, there were some general issues raised. The most significant was the perceived connection between changing behaviour and the reduction in costs. The GDs all thought that the major motivation for saving water was financial rather than a concern with environmental issues and conservation, and saw the advice they gave on potential savings involved as a crucial aspect of the intervention.

John put it this way: *If they have been spending £500 and now they are spending £200 and their behaviour changes – I've done my job. If they want more then can give more. If you leave without putting in shower heads - they are the ones that need it - some people don't realize every drop from your tap is costing - but the amount they use can be reduced. Even I if they don't change the time they are in the shower.*

While Al emphasized a general lack of information:

People don't realise how quickly water gets wasted. So making them realise water usage is going to be monitored, I think that transition is the biggest surprise or learning curve for people. People are unaware of things… most people think using the washing machine or the dishwasher is the highest after shower or the bath.

Even when devices could not be installed, the GDs thought it important to establish how the householders used the appliances and give them information. One GD mentioned the danger of seeming to patronize people, and considered that giving hard facts might be better than imparting information about behaviour change. As Linda explained: '*it's tricky- you have to tell people to change their habits- and people don't like to change their habits*'

The financial incentive to change behaviour was nevertheless reported by all the GDS to be high, since most people, particularly those on lower incomes are concerned about costs. This finding corresponds with Wills, Stewart et al (2013, 111) study of water consumption on the Gold Coast in Queensland who consumed approximately 8% less than average water consumption As Miles concluded:

No matter what they do no one wants to chuck £. out the window- it's not what we say - it's how we say it.

Another GD concurred with this: *'You have to hit them with core facts- talk more about money- tell them how much the current shower head costs them- £600 this one will cost you £200- hit them quickly- now we are talking. The education side of it can come later- the fact that they now have new shower heads etc. - hit them with the facts'*. (John).

Where devices are not required GDs concentrate on estimates of current costs and potential savings, finding people pleasantly surprised if they are revealed to be moderate water users, or interested in finding out ways of making further savings. In his view younger people were more concerned with saving money and the older generation more interested in saving water. Some of the GDs noted problems with the devices. Some were described as faulty or difficult to fit. While others commented on the fact that many people accepted the devices because they were free, but were likely to set them aside following the visit, or throw them out. Where people had heard of the installation of the devices from neighbours by word of mouth, their installation was more welcomed. Particularly popular was the shower timer for those with teenage children and the swivel tap for the kitchen.

Socio-demographic differences

Several other studies have emphasised the significance of socio- demographic variables in explaining why water consumers choose, or not, to change their behaviour (e.g. Jenkins and Pericli, 2014). In this research the GDs all identified differences between the responses and cultural practices of different social and ethnic groups, which were also revealed in our household

visits. The major differences were: class (as defined through education or income), ethnicity and age.

Class

Lack of education (as noted in other studies, (Gilg and Barr, 2006)) or reluctance to be educated about water use was noted by some of the GDs. Others pointed to the demoralising effect of living in poor accommodation that mitigated making changes, even if they did mean a reduction in expenditure. Equally in dwellings with a large number of occupants (often unrecorded), there was a reluctance to discuss the bills or practices of the inhabitants. Those on higher incomes were also noted as sometimes indifferent to water saving devices or practices as Tony described:

I went to a man who didn't care that much. He had a nice home- I offered a shower timer- he said ''no don't bother- if I want a 10 minute shower I'll have one''- so saving £50 on shower is meaningless to them'

However, the picture is complex, since some high income owners of larger houses were also open to new ideas and making the effort to change. This underlines the difficulty of homogenizing responses too simplistically across social and cultural groups.

One of the GDs who himself was Afro- Caribbean noted particular responses from other Black people where: *'Caucasian person is more inclined to hear what I have to say. Afro -Caribbean guy- what is this guy doing – suspicious- they are more likely to go 'hey man… the way you present yourself affects how they relate to you. So your greeting might vary from `how are you doing bro?' to Good afternoon sir"'*.

Ethnicity

All of the GDs reported ethnic differences in water use, practices and attitudes. In Thamesmead, which was a key site in the study and where there is a concentration of African (particularly Nigerian households), there was a pattern of using water sparingly, such as bucket washes in the bath were common, a practice even passed on to the next generation. As Tony explained: *Africans have had to walk to get water where they come from so they are not wasting it.*

This awareness of the significance of water was often transmitted through childhood to people, and many of those who still had relatives in countries where water was scarce had experienced first-hand the value of water for those whose access to it was limited. There was thus a striking pattern of first or second-generation migrants being very open to the smarter home visit.

A contrasting picture was given of migrants from countries, like Turkey, where many had access to free water. In these cases, some GDs suggested, people tended to use more water and some individuals even thought water in the UK was free. Another factor mediating against water saving was seen to be a dominant perception, amongst Asian people particularly, that it was unhygienic not to wash dishes and vegetables in running water. Suggesting that people should not throw fat down and should use the fat-traps offered, was also a potentially sensitive issue.

Age

A common observation was that older people tended to be more careful with water, and often very grateful to have clean water. As Miles pointed out:

The older people particularly are very conscious of these things. Taking water saving advice to people who are 50 plus they can tell you what to do. The younger generation much less so. Older people who grew up in the war pass on advice to the baby boomers- it's the next generation who are spoilt with everything.

Though the picture was multi- faceted, since according to Mike, it was difficult to *'teach old dogs new tricks- an older person who has always had baths- not going to change them- I like my bath- younger person might be up for a two minute showers*.'

Gender

Gender differences were also evident. Single parents, particularly those on low incomes or benefits, were said to be too busy to attend to the smart home visit. In these households, the cost of installation of a new washing machine or dishwasher with an eco-setting was prohibitive. GDs also reported that single parents sometimes made appointments that were missed due to the pressing demands of single parenthood with little support. In couple households, in contrast, a pattern of women knowing the bill amount and paying it, was also noted as common. Some GDs pointed out that focusing on women with children was a good strategy since: '*they are high water users- if we could hit them- then that is jack pot- that is my impression…... girls do wash their hair every day – do their shaving- also enjoy the shower-… pampering.. definitely the teenagers – but also the 30 somethings are heavier users'* (John).

3. Household Responses to the Green Doctor Visits

Not only do smart city initiatives often assume a homogenous individual as a recipient of the interventions, there is also a tendency to overlook the complexity of responses. Household responses emerge from an entangled web of social, cultural and technological relations that are formed in specific places and contexts over time. The multiplicity of responses in our research threw up a cluster of patterns that we categorised into the following types:

The Sceptics

These households (8% of those interviewed) tended to greet the Green Doctor with an overt or covert hostility. During the interview they were inclined to pass negative comments. If they followed the GD around as s/he installed devices, the comments were typically disparaging. In this group, a couple of households had heard that individuals were masquerading as Thames Water operatives and were trying to enter houses in the area. Having unsuccessfully telephoned Thames water to confirm the appointment, they were thus reluctant to let the Green Doctors in.

These households were sceptical about the smarter home visits for several reasons. Some saw Thames Water as an organisation motivated by the pursuit of profit that could only have ulterior motives in trying to persuade customers to reduce their water consumption or change their practices. A similar trend was identified by (Browne, Medd et al. 2014) who suggested: 'if consumers regard their water provider to be untrustworthy, they are more likely to be unreceptive to proposed water conservation or efficiency initiatives, and thus these individuals (or households) are unlikely to be responsive to potential behaviour changes'(66) . Others were suspicious thinking that information was being collected that could influence their bill, or saw the visit as intrusive or reported having had negative experiences with Thames Water in the past. A further group was sceptical about the potential for behaviour change or thought that the devices were cheap and shoddy. One household, for example, had recently remodelled their bathroom and invested a lot of money and thought into their taps and shower head, and didn't want 'cheap looking' products to be installed. One householder commented: '*You tell us how to use water- I am not telling you how I use water'.*
While an older white couple, said it was too late now to change their behaviour and objected at attempts to do so:

'*We have lived here for 18 years. I used to keep koi carp – which I gave up 6 years ago when I had a serious accident and also when the neighbour poisoned my fish- and at that time I used 6 cubic meters of water. But now I get even higher bills even though I am using much less water obviously.*

6 years ago my bill was £85 per half year, now it is £186 per half year. So clearly they have put the prices up.

I don't think water should be for profit, obviously they have got to make some money to cover costs, but they shouldn't be making large profits for their shareholders. I tried to find out what profits they were making and they claimed crown immunity'

And '*I think it is all about PR. Water should not be provided by profit based organisations. Also I am a technical person and this aerator they put on the kitchen tap- it is failing already. It is leaking- letting water through. And it has only been on for two months. It is also getting furred up as we have soft water here. So I am thinking of taking it off.*

'They put in the saving device in the cistern. I think they could more usefully do a simple conversion to dual flush – it would cost £20- and that would work far better. You then use 3 or 1 gallon'.

'*If the devices did save water there would be benefits but then they push the prices up. I am concerned about the motives. I don't think it's a waste of time necessarily but I am concerned about the motives.*'

The Concerned

14% of the households in the research study were environmentally conscious and concerned about issues of climate change, and the wasteful use of resources and energy supplies. This tended have higher levels of education and concentrated in the professions, following other studies (Gilg and Barr, 2006). These householders already knew some aspects of water conservation issues and were keen to learn more, and take the advice of the Green Doctors on water saving practices, and the use of devices. The 'concerned' were typically expecting the smarter home visit, were welcoming at the door, happy to answer the questions in the survey, asked questions themselves and were interested in how much water was saved by the installation of water saving devices.

This group included:

a) An Afro Caribbean man (mid 40s) working in IT who described the difficulties he had persuading his young female lodgers to decrease their time in the shower. He showered at his gym every day. He was very enthusiastic about the water saving devices: '*man this is a good day!*' He had energy saving bulbs and standby switches, and turned off the taps when he brushed his teeth.

b) A track fixer for London underground. The GD showed him how the smart meter works and he was very interested. The GD gave a lot of advice and the householder was very open to change even though he was unaware of the water use involved in tooth brushing with the water running. He thought the shower timer was a good idea which made one more conscious and even though it kept falling off during the installation, the householder said: '*never mind I'll super glue it*'.

c) An older white couple (70s) living in a housing association flat. The man had worked in passenger services for the disabled. They used a washing up bowl once a day. The male householder wetted and soaped himself and then turned on the shower, while his wife took longer – an average of 5 minutes as she 'relished the hot water'. They saved water from the shower that they collected in a plastic bin to recycle for the garden. They also used their water also to water flowers for the woman downstairs, never put fat down the sink, and welcomed the installation of devices.

d) A 14 year old teenager whose mother was in education and father was a driving instructor living in a large owner occupied rambling house in Bexley was very environmentally conscious, having learnt about the issues both at school and from his parents.

e) A young woman from a mixed African and white British family, described a family where water conservation was paramount. She made the point that her mother (a nurse) was keen on recycling and had been very insistent that they considered the environment when they were growing up. She had grown up in West Africa where water was scarce, and after arriving in England, like many Africans, had washed in the bath with a bucket, and carried on this tradition with her family. She was very enthusiastic about the devices, commenting on the timer: '*That will be good for my boys!*'

f) A Nigerian single parent in her 40s in Charlton had already ordered and installed the saver flush and shower head from Thames Water. She had difficulty persuading her children to turn off the tap that she put down to their young age.

The Budget Conscious

Budget conscious householders (22% of those interviewed) were motivated to save water primarily to keep their water bills down, and were not necessarily concerned about the environment. The majority of this group were lower income households, living in housing association accommodation or council housing. Only 3 of the 21 people in this group were homeowners. Those whose primary interest was in reducing the water bill were from every ethnic and racial background, and included several single parent families. The budget conscious were usually aware of the smarter home visit. They carefully listened to the advice given by the Green Doctors and were happy to see devices installed. Comments were made during the visit as follows:

'We're quite frugal and conscious'

'I can't afford to leave the tap running'

When the GD explained the swivel tap, the householder said: '*Everything that saves money is good'.*

'It's Important that it's saving something'

'People don't want to be paying expensive water bills'

'They're small little things but if you combine them I can see it makes a difference'.

'People take more care when they pay for what they use' (Home owner).

Indifferent

The indifferent category represented the largest majority (29%) in the sample, with wide variations in the reasons for this response. Some of the householders were indifferent because at the time of the visit the named householder was not at home, so that the smarter home visit was carried out with a different person from the person with whom the appointment had been made, or from the person who owned the property, and thus they were little invested in hearing the advice that was given.

Others were individuals who were tenants who were not responsible for the water bills. As it was not their own house they were not particularly concerned about whether the devices could be fitted or whether they would help them save water. For instance, one tenant in a large shared house said, 'I won't spend any money, it's not my house'.

Some householders were wealthy property owners with large houses who had installed expensive taps and fittings and were not interested in having devices added to their already carefully thought through installations. They acknowledged that their houses had high bills, usually as a result of the large number of bathrooms and facilities (e.g. one house in Kidbrooke had 7 bathrooms, 9 taps and 2 dishwashers) and were not particularly motivated to save money on their bills. At the other

end of the income spectrum were individuals who were on income support and who were not responsible for their own bills which were paid by direct debit. They too took little interest in how to save money or water because it was not something which affected them directly.

Others had disabilities which prevented them engaging with the visit. In these instances, GDs often had to cut the questionnaire short and attempt to install the devices with little to no supervision from the householder. Individuals with disabilities also tended to have difficulty showering and bathing which would result in a long amount of time spent showering or bathing. The GDs took account of this in the calculation of their bills. Some individuals, usually middle class and homeowners were working from home when the GD visited and were reluctant to spend too much time answering the questionnaire.

Another group were those who had limited English and thus were constrained in their interactions with the GD, often as a result showed little interest or involvement in the home visit.

Freebies

This was a small (8%), but very noticeable group of individuals. The people identified as 'Freebies' were mainly interested in the smarter home visit because of the prospect of receiving free products from Thames Water. They weren't necessarily concerned about saving water or learning about conservation, but were keen on the devices, especially the new showerhead and shower timer. One householder said, when their new mixer tap was installed '*If it's free of charge, why not?*' Another homeowner in Woolwich said '*it's nice to get some freebies'*.

Some of the householders were concerned that they were going to be charged for the devices, asking *'Do I have to pay?*' expressing surprise when they found out that they were receiving these products free of charge.

Interested and Curious

As far as the GDs are concerned, the interested and curious (constituting 18% of the sample) were the most enjoyable homes to visit, since they wanted to learn about water conservation and how to reduce water consumption and the cost of their bills. Many of these householders were well-educated and already well informed about water issues but were still keen to be reminded about how to save water and to learn any new information the Green Doctors could report. One householder for instance, said that it's 'interesting to find out the various things you can do', saying she found the visit both 'useful' and 'instructional'. During her follow-up visit she commented: '*The visit in itself was useful and I slightly defend my position that I did know pretty much anything he was telling me but it was no bad thing to hear it again. It did make me slightly more aware after the event of just general consumption and what you're doing during your day. But there's a minimum amount that goes on in the house that doesn't change*.'

One Filipino homeowner was so interested in the estimates of his expenditure on water that he calculated that a 10-minute shower was the equivalent of a barrel of water. A few individuals in this category had previously contacted Thames Water about their water use and already ordered some of the devices off the internet. One homeowner engaged the Green Doctor in a lengthy discussion about water use, water shortages and water metering. In his follow up visit he said he was impressed that the Green Doctor was willing to listen and take the time to answer his questions. Some of the householders came from countries where there was a shortage of fresh water, where water was used in very different ways, or managed differently, and were interested to share their experience with water overseas and to reflect on the differences between water use in their country and the UK. For instance, one man from the Democratic Republic of Congo commented that 'In England, people are more careless with water. In Kinshasa they already have water metres so people are more careful'.

Others wanted to watch the installation carefully and learn new ways of saving water and get tips from the Green Doctors. For instance, one householder commented, when they learned that the dishwasher was more efficient than washing up by hand said '*ah, interesting, that's good to know… this visit is a real eye opener*'. In response to the devices and the metring, one householder commented 'the things people think of and invent, I find it fascinating'.

4 Post visit interviews

Approximately 20 in depth interviews were conducted with households who had received the smarter home visit during the research period to explore how the visit was perceived after some time had elapsed, how the installed devices were working, and whether the household had changed their water consumption practices. The responses were varied, with a majority of the households visited giving a positive account. This is likely to reflect, however, a bias in the households who agree to a second visit, since it is probable that the more negative households refused a follow up interview- certainly this was the pattern in the telephone interviews (a further 20 people).

Changing behaviours

There was a considerable variation in the extent to which people reported a change in their water consumption practices. At one end of the spectrum, no change had taken place. As one mother explained: ' my sons play a lot of sport and a lot of water is used for washing their clothes or showers and we have no intention of changing that'. In some of the better off householders, where saving money was not a high priority, the pleasures of long showers and large baths were seen as too great to be relinquished. Others simply claimed that habits of a lifetime simply could not be shifted, with sometimes a rather belligerent tone in response.

Some cultural issues emerged here, which related either to traditions in the place of origin, or to religious beliefs and practices. One Nepalese man (a former Ghurkha) described the difficulty of persuading the women in his household to wash their vegetables and dishes in a bowl in the sink, since in his country fresh running water was plentiful, and the notion of washing things in water that was not flowing was seen as unhealthy. While on the other hand, various Muslim people described a respect for water, and a tendency to conserve water, which they had learnt from childhood. As Mohammed, a Bengali man explained: '*Islam taught me from an early age – when you go to Saudi-and you are on a pilgrimage and you use unnecessary water- you are told God won't be happy - even from childhood… Our religion says if you use more water for unnecessary reasons- it is seen as a sin….It is common sense'*.

Richard, whose parents migrated from Jamaica, reported being brought up not to be wasteful:

'I had my first trip to Jamaica when I was 21 and it was a bit of an eye opener- You had to pay for water there- to have the tank filled- so there you don't flush the toilet there unless you did no. 2- so it gave me a whole new look. We are a lot better off than most of my family out there. …I don't take it for granted any more'.

This kind of understanding was not just restricted to people from less developed parts of the world: *'My parents are in Australia and awareness of water consumption is very high there and so if you run a bath and there's cold water at the beginning you put a bucket underneath and save the cold water till it gets hot. You use it for something else, you don't just waste it. Behaviour is very much shaped by that awareness there and we don't have any of that in this country'.*

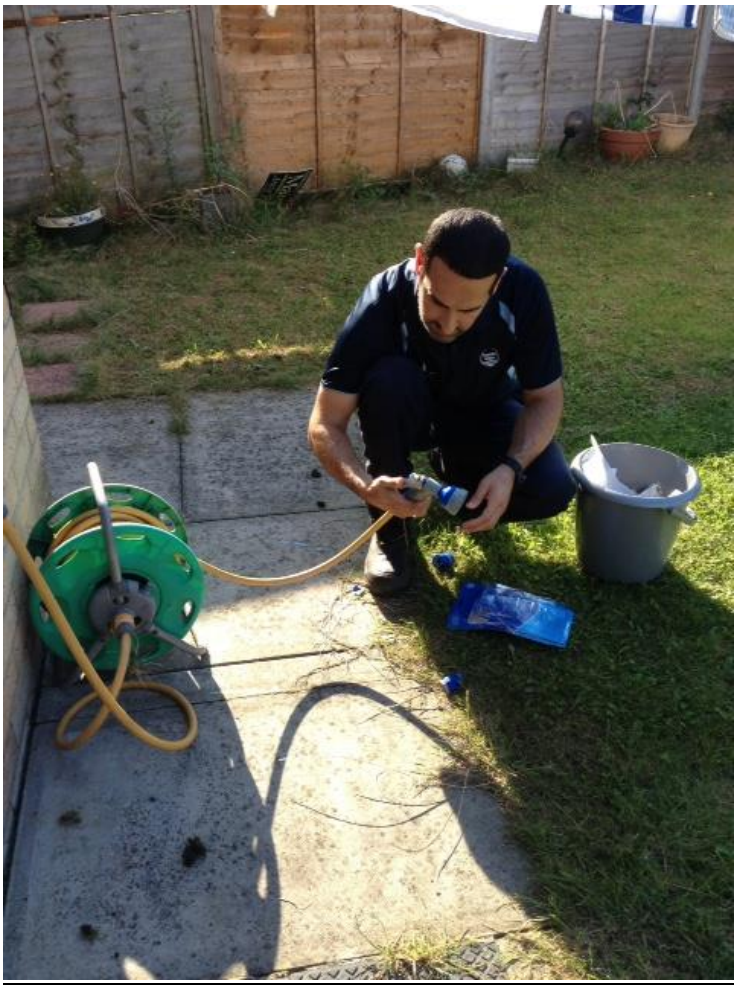
More ambivalent responses were given by parents who reported that they had tried to change their children's – particularly teenagers- practices (shower times in particular) with little effect. There were however, a considerable number of people who reported various changes in their practices, from using a bowl to wash dishes to cutting back the length of time in the showers. This

group comprised a higher proportion of educated, or concerned people. Hilary, who lived in a large mansion in Blackheath, for example reflected: *'You asked what we did after the event and I talked to the kids and I did put the shower timer in. I'm very proud of the fact that half of my showers are only half of the shower timer. I get in and out and get clean. My husband I think he's used it a couple of times but it was a challenge to him to see if he could do it.'*

Becoming more informed after the visit had clearly motivated some people: *'It's good. I learned from you. I learned I don't need to leave the water flowing if I don't need that water actually. Not only necessarily for my pocket but for other people. I am thankful because you changed something in our behaviour. It is good'.*

While saving money motivated others: '*You know wasting, if you waste anything this is not a good thing. You have to keep your eye on everything, on water on food, everything you need to keep an eye. You need to spend that much and not waste extra. Not just good for us, good for everyone to do these things'.*

Devices



Responses to the devices were largely positive, though in some houses they had been little used. Most householders remembered what had been installed, with greater enthusiasm for some devices than others. Many perceived the reduction in water flow in the showerheads to be offset by the aerated sensation of the water. The saver flushes were well received, though one respondent said: *'They put in the saving device in the cistern. I think they could more usefully do a simple conversion to dual flush – it would cost £20- and that would work far better. You then use 3 or 1 gallon'.*

The fat traps were discarded and valued in equal measure- one older man said he took the fat up to his allotment to feed the birds. Similarly there were mixed responses to the kitchen swivel tap, where some respondents reported that it had ceased to function, while another reported: *It was useful because the kitchen before when we opened water it was very fast, it was pouring outside the sink because it was very fast and strong. Now it is very nice and smooth'.*

'*It was noticeable with the new taps, they give the impression that the water's coming out at a faster rate you unconsciously turn the tap down'*

The fact that the devices were free was appreciated. A minority of respondents were negative about the devices saying that they were and had broken: *'Also I am a technical person and this aerator they put on the kitchen tap- it is failing already. It is leaking- letting water through. And it has only been on for two months. It is also getting furred up as we have soft water here. So I am thinking of taking it off*'.

Perception of the visit

The majority of respondents reflected positively on the interview, though it has to be remembered these were people who had agreed to the visit in the first place. For example, Doris an unemployed Nigerian woman in her 30s said: 'I found it positive- it creates awareness about things I never really bothered about before'.

Most respondents remembered both the devices and the advice they were given about water use. As one white working-class man put it: '*In essence you were just coming along to re-educate people about water and the different ways you could save water. You had a number of gadgets and things. I think one of them was a nut you could put on the taps, and you also changed the nuts that were on the taps and gave the impression of the water coming out at a faster rate but it was filled with air bubbles. The reason I remember that is because my son, my younger one said how come you're trying to get us to save water and you tell us that Thames water have come around and yet the water's coming out faster? '*

Some people responded uncertainly, saying that they needed to see a current bill to evaluate the effects. While others were simply enthusiastic, like this Chinese woman in her 60s who worked for a property company: *'I think it is very good- they tell you how to save water. I think it is a brilliant scheme. I just got the bill. It seems useful. I used a lot of water in summer in the garden to water. Hose gadget therefore was very useful…..A lot of people don't like Thames Water- I say I do! They really care. Why should they care if they want to make profits? Why do they want to do that? Everyone should be pleased to save water and money on the bill'.*

There was, however, a group of people who were fairly sceptical response to the visit reflected in comments like 'it was just a PR job for the company', or 'I don't think the savings are that great'. Mr G. put it this way: *'I don't think water should be for profit, obviously they have got to make some money to cover costs, but they shouldn't be making large profits for their shareholders. I tried to find out what profits they were making and they claimed crown immunity'.*

Another group said that it was good for other people but they were doing well already- often as a result of their parents or grandparents bringing them up to be careful with water, a perception sometimes fuelled further by the Green Doctors comments like '*you're doing really well*' during the smarter home visit.

Thames Water and education

Householders were asked if they thought Thames Water had a responsibility to educate their customers about water. The majority thought that it was a good idea, though some people were doubtful it would make much difference: *It's a good move. It shows a bit of concern really because big companies all you think about big companies are there to rip you off. So Thames company is*

showing the initiative to go along and try to save people money. Normally when companies do such things there's strings attached, they're trying to rope you into something else.

And '*But this is a genuine attempt to help you save money. It would be good if the other companies took notice and did the same thing, with electric, gas.*

This is very good idea to check with people if somebody doesn't know. Surely most people will know that but if somebody doesn't know how to use the water, if they waste the water, speaking with them, this is very nice to understand how...

'Yeah because I think a lot of people don't think, they just take it for granted that you turn the tap on and it comes out and goes down the plug hole'.

'Providing people listen and act on it. I suspect a lot of people won't'.

'They need to give an introductory book or leaflet- good idea!'

There was also an opposing view that water companies were concerned with selling water and making profits, and that education was thus a cynical move to enhance their commercial success.

Water supply

Finally, householders were asked to consider the probability of a water shortage is their lifetime. Here the majority thought not, and found it hard to believe with all the rain, or the recycling of water in the UK, that there would be a problem in the near future. This contrasts strongly with the studies of Australian water consumption and conservation where there is a widespread recognition of water scarcity (Head, 2008; Troy, 2008). There was, though, recognition that it might become scarcer: *'Not in my lifetime I don't think. I think one day it will be more expensive than petrol. If they thought about it like that. I don't think people think further from their own generation'*.

Or that it was possible to predict the future: *'Run out of water? Nothing is guaranteed in this world! The world changes all the time'.*

I don't know about the running out of water just because of where we are in the world but certainly the facility for clean water and the fact of it being there on the tap is something we shouldn't assume will be there all of our lives. We should actually work for that.

If there are shortages it's down to the big companies. They must be aware of what they need to do to filter it and supply it. It's like supply and demand for your car. If they all got their act on together they could work it out.

Oh, that's a really big subject. I'm one of the sceptics. I'm a sceptic. I think we know far too little about... (the way the climate system works)... for us to justify climate change…. Eventually the ordinary people are going to have to pay more. Whereas the big companies, still drive their big cars, still have their big engines, you get the royals and everybody else, the presidents, Al Gore, all of these people championing the cause, they have the largest 4x4 motorcades and everything else. That's why I don't buy into it. That's why I don't subscribe to it really'.

And *'I've used the boxes that you gave me, I've just used it once, it's generally just easier to put it in our food rubbish'.*

Conclusion

Smart city initiatives are often delivered with limited knowledge as to their reception at an individual or household level. The water efficiency team at Thames Water have consistently been concerned as to the effects of their initiatives on the ground, hence their support for this research.

In particular, there remains relatively little understanding as to how smart city initiatives are perceived by different socio-demographic and cultural groups. This study explored a number of different issues- namely the multiplicity of responses to the smarter home visit, and how these were socio-culturally differentiated. The research revealed that there were clear differences in the water consumption practices and understanding of households according to class, gender and ethnic differences that have also identified in earlier studies of water conservation practices in Australia in particular. The research also identified a multiplicity of reactions to the smarter home visit that were categorised as – indifferent, sceptic, interested and curious, concerned and (attracted to the) freebies. These responses were motivated by different experiences as well as socio- demographic and economic characteristics of households.

Overall, the research concluded that the Thames Water Smarter Home Visit was shifting the water consumption practices and understandings of at least the majority of households in the sample. Further research would benefit from more post visit in depth interviews, as well as quantitative evidence that compared pre visit and post visits bills to provide a framework for this more qualitative piece of research.

Brief Summary findings and recommendations

Findings

- The majority of the visits were well received by householders.
- Groundwork's Green Doctor Service is of the highest standard and competence.
- The major motivation for saving water was financial rather than a concern with environmental issues and conservation.
- There was a large group of householders whose attitude to the smarter home visit was indifferent or sceptical.
- The fact that the devices were free represented a big attraction.
- Different cultural traditions impact strongly on water use practices.
- Door knocking requires a high level of skill and patience and is demanding work.
- Follow up interviews revealed a considerable variation in the extent to which people reported a change in their water consumption practices from those who reported not change at all, to those who valued the devices and had changed their practices.

Recommendations

- Green Doctors should install the devices first before conducting the questionnaire.
- The pre-visit letter should be replaced with a highly visual postcard with clear information about the proposed Smarter Home Visit.
- The Green Doctors should be sensitive about how they give information, explaining the use of devices in an open and accessible way.
- The devices need to be of a good quality.
- The Green Doctor training should include diversity awareness issues.
- Particular attention should be paid to women with teenage children since these are high water users.
- Green Doctors should be trained to deal with households who meet them with a sceptical or hostile response.

Acknowledgements

We would like to thank Thames Water for funding this project. We would also like to thank Groundwork for allowing us to shadow the Green Doctors, and the Green Doctors for sharing their expertise, their vans and their company. We would like to thank the householders who agreed to talk to us in the post household visit interviews. The photographs were taken with the participants' permission.

References

Browne, A., W. Medd, et al. 2014. Distributed Demand and the Sociology of Water Efficiency. K. Adeyeye. *Water Efficiency in Buildings: Theory and Practice* Chichester, Wiley Blackwell.

Cosgrave, E Doody L Walt N 2014 *Delivering the Smart City: governing cities in the digital age.* Arup, Liveable Cities, UCL, and the Smart Cities Expo

De Oliver M. 1999 Attitudes and inaction: a case study of the manifest demographics of urban water conservation. *Environment and Behavior.* 31:372–394.
Hamilton L.C. 1985 Self-reported and actual savings in a water conservation campaign. *Environment and Behavior*. 17:315–326.

Head, L. 2008. Nature, networks and desire: Changing cultures of water in Australia. *Troubled Waters: Confronting the Water Crisis in Australia's Cities.* P. Troy. Canberra, Australian National University Press**:** 67-80.

Hines, J. M., Hungerford, H. R. & Tonyera, A. N. 1987) Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *Journal of Environmental Education*, 18, 1-18.

Jenkins, J. and A. Pericli A 2014. Understanding Consumer Response to Water Efficiency Stategies.In K Adeye *Water Efficiency in Buildings: Theory and Practice. K. Adeyeye*
Troy_, P 2008 *Troubled Waters: Confronting the Water Crisis in Australia's Cities..* Canberra, Australian National University Press**:** 67-80.

Willis, R. M., R. A. Stewart, et al. 2013. "End use water consumption in households: impacts of socio-demographic factors and efficient devices." *Journal of Cleaner Production* 60: 107-115.